

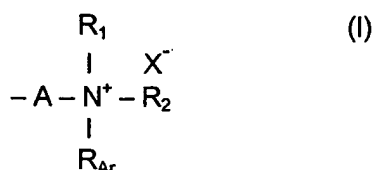
Claims

1. A cationised polysaccharide product comprising a polysaccharide having at least one first substituent having an aromatic group and at least one second substituent having no aromatic group, wherein the first substituent and second substituent are present in a molar ratio within the range of from 10:1 to 1:10.

2. The cationised polysaccharide product of claim 1, wherein the first substituent and second substituent are present in a molar ratio within the range of from 7:1 to 1:7.

3. The cationised polysaccharide product of claim 1, wherein it has a cationic charge density within the range of from 0.05 to 4.0 meq/g.

4. The cationised polysaccharide product of claim 1, wherein the first substituent comprises the following general structural formula (I):

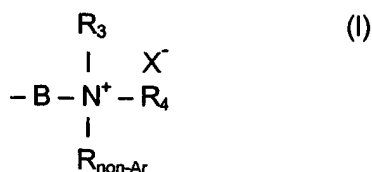


wherein A is a group attaching N to the polysaccharide,  $R_1$  and  $R_2$  are individually H or alkyl having from 1 to 3 carbon atoms,  $R_{Ar}$  is an aromatic group containing 1 to 12 carbon atoms, or, alternatively,  $R_1$ ,  $R_2$ , and  $R_{Ar}$  together with N form an aromatic group, and  $X^-$  is a counterion.

5. The cationised polysaccharide product of claim 1, wherein the first substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_2)\text{CH}_2\text{C}_6\text{H}_5 \text{ Cl}^-$ .

6. The cationised polysaccharide product of claim 1, wherein the first substituent comprises a benzyl group.

7. The cationised polysaccharide product of claim 1, wherein the second substituent comprises the general structural formula (II):



wherein B is a group attaching N to the polysaccharide,  $R_3$  and  $R_4$  are individually H or alkyl having from 1 to 3 carbon atoms;  $R_{\text{non-Ar}}$  is a non-aromatic group containing 1 to 4 carbon atoms; and  $X^-$  is a counterion.

8. The cationised polysaccharide product of claim 1, wherein the second substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_3) \text{ Cl}^-$ .

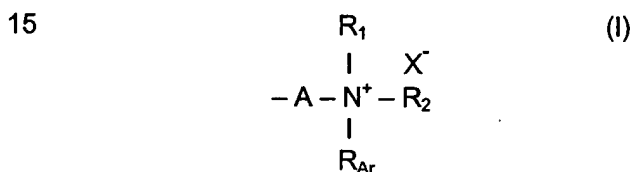
9. The cationised polysaccharide product of claim 1, wherein the first substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_2)\text{CH}_2\text{C}_6\text{H}_5 \text{ Cl}^-$  and the second substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_3) \text{ Cl}^-$ .

10. The cationised polysaccharide product of claim 9, wherein the first substituent and second substituent are present in a molar ratio within the range of from 7:1 to 1:7.

11. A cationised polysaccharide product comprising one or more polysaccharides having at least one first substituent having an aromatic group and one or more polysaccharides having at least one second substituent having no aromatic group.

12. The cationised polysaccharide product of claim 11, wherein it has an overall cationic charge density within the range of from 0.05 to 4.0 meq/g.

13. The cationised polysaccharide product of claim 11, wherein the first substituent has the following general structural formula (I):

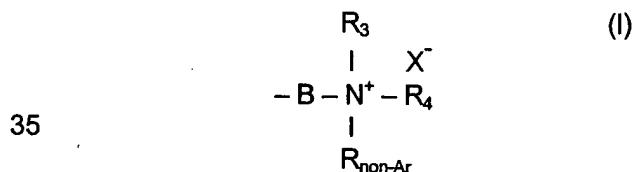


wherein A is a group attaching N to the polysaccharide,  $\text{R}_1$  and  $\text{R}_2$  are individually H or alkyl having from 1 to 3 carbon atoms,  $\text{R}_{\text{Ar}}$  is an aromatic group containing 1 to 12 carbon atoms, or, alternatively,  $\text{R}_1$ ,  $\text{R}_2$ , and  $\text{R}_{\text{Ar}}$  together with N form an aromatic group, and  $\text{X}^-$  is a counterion.

14. The cationised polysaccharide product of claim 11, wherein the first substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_2)\text{CH}_2\text{C}_6\text{H}_5 \text{ Cl}^-$ .

15. The cationised polysaccharide product of claim 11, wherein the first substituent comprises a benzyl group.

16. The cationised polysaccharide product of claim 11, wherein the second substituent has the general structural formula (II):



wherein B is a group attaching N to the polysaccharide,  $\text{R}_3$  and  $\text{R}_4$  are individually H or alkyl having from 1 to 3 carbon atoms;  $\text{R}_{\text{non-Ar}}$  is a non-aromatic group containing 1 to 4 carbon atoms; and  $\text{X}^-$  is a counterion.

17. The cationised polysaccharide product of claim 11, wherein the second substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_3) \text{Cl}^-$ .

18. The cationised polysaccharide product of claim 11, wherein the first substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_2)\text{CH}_2\text{C}_6\text{H}_5 \text{Cl}^-$  and the second substituent comprises  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{N}^+((\text{CH}_3)_3) \text{Cl}^-$ .

19. A cationised polysaccharide product comprising a polysaccharide having a degree of aromatic substitution ( $\text{DS}_{\text{Ar}}$ ) within the range of from 0.0005 to 2.0 and a degree of non-aromatic substitution ( $\text{DS}_{\text{non-Ar}}$ ) within the range of from 0.0005 to 2.0.

20. The cationised polysaccharide product of claim 19, wherein the polysaccharide has a degree of cationic substitution ( $\text{DS}_{\text{C}}$ ) within the range of from 0.02 to 0.5.

21. A cationised polysaccharide product obtained by reacting one or more polysaccharides with:

- (i) at least one first aromatic agent; and
- (ii) at least one second non-aromatic agent;

wherein the first aromatic agent and second non-aromatic agent are reacted in a molar ratio within the range of from 10:1 to 1:10.

22. The cationised polysaccharide product of claim 21, wherein the first aromatic agent and second non-aromatic agent are reacted in a molar ratio within the range of from 7:1 to 1:7.

23. The cationised polysaccharide product of claim 21, wherein the first aromatic agent is a cationic reaction product of epichlorohydrin and a tertiary amine having one or more aromatic groups.

24. The cationised polysaccharide product of claim 21, wherein second non-aromatic agents is a cationic reaction product of epichlorohydrin and a tertiary amine having non-aromatic hydrocarbon groups.

25. A cationised polysaccharide product obtained by reacting:

- (i) a first polysaccharide with at least one first aromatic agent; and
- (ii) a second polysaccharide with at least one second non-aromatic agent;

and then mixing the polysaccharides obtained.

26. The cationised polysaccharide product of claim 25, wherein the first aromatic agent and second non-aromatic agent are reacted in a molar ratio within the range of from 7:1 to 1:7.

27. The cationised polysaccharide product of claim 25, wherein the first aromatic agent is a cationic reaction product of epichlorohydrin and a tertiary amine having one or more aromatic groups.

28. The cationised polysaccharide product of claim 25, wherein second non-aromatic agents is a cationic reaction product of epichlorohydrin and a tertiary amine having non-aromatic hydrocarbon groups.